



Research Product 2011-09

**After Action Review Guide for Trainers of Virtual
Battlespace-2 Missions**

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June 2011

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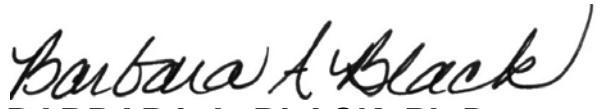
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14. ABSTRACT (<i>Maximum 200 words</i>): The Virtual Battlespace-2 (VBS2) training simulation provides special feedback capabilities for supporting mission after action reviews (AARs). To help AAR facilitators leverage the software's special AAR capabilities, the <i>VBS2 AAR Guide</i> was created to serve as a professional development and performance support tool. Full details on the development of the guide can be found in ARI Technical Report 1294, <i>Guidelines and Tools for VBS2 Mission After Action Reviews: Development and Evaluation</i> . The guide incorporated doctrinal AAR guidelines as well as best practices gleaned from academic and technical literature. The guide underwent iterative review by schoolhouse leaders and instructors during initial development. The guide was then field tested by cadre members of three different Army courses and revised based on their feedback. This publication describes the contents, organization, and presentation style of the guide. It includes the complete guide along with suggestions for utilizing the materials to realize optimal benefits. The products are the culmination of a multi-faceted research program that developed methods and measures for communicating tactics, techniques, and procedures to Soldiers.					
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AFTER ACTION REVIEW GUIDE FOR TRAINERS OF VIRTUAL BATTLESPACE-2 MISSIONS

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AFTER ACTION REVIEW GUIDE FOR TRAINERS OF VIRTUAL BATTLESPACE-2 MISSIONS

Introduction

In the training circles of the U.S. Army, units and institutions are harnessing the power of computer-based combat simulations. Some of the latest simulations are low-cost, multi-player games that provide a remarkably realistic tactical environment. In an ongoing initiative, the Army has been fielding the Virtual Battlespace-2 (VBS2) game. This commercial off-the-shelf, interactive, first-person shooter game enables small units to train collective tasks on a three-dimensional battlefield. Soldiers and leaders execute scenario-driven missions that set the stage for discussion of performance in technology-supported after action reviews (AARs). The VBS2 software provides special feedback capabilities, such as mission playback and versatile camera views, to accelerate the AAR learning process. As the Army continues to expand its utilization of VBS2 training exercises, there is a need for a tool to help AAR facilitators put the game's simulation-based AAR capabilities into practice.

To meet the need, the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) has developed the *VBS2 AAR Guide*. The guide serves as a resource that helps AAR facilitators to (a) understand the AAR capabilities of the VBS2 software, (b) plan and prepare for AARs of VBS2 missions, (c) lead highly effective AAR sessions, and (d) enhance Soldier learning by exploiting the special VBS2 features. The guide contains orientation materials, a VBS2 overview, stage-by-stage guidelines, and an integrated list of VBS2 AAR capabilities. The ultimate goal is to enhance the Soldier learning process by harnessing the feedback power of the VBS2 system.

By utilizing the *VBS2 AAR Guide*, training facilitators in schoolhouses and units can realize the following benefits:

- Become more effective trainers by improving their ability to employ the VBS2 workstation's AAR features.
- Enhance the effectiveness of VBS2 training events by fully exploiting the power of VBS2's AAR capabilities.
- Increase Soldiers' participation in AARs of VBS2 exercises, in turn boosting their motivation to contribute to and learn from the discussions.
- More effectively enable Soldiers to identify performance deficiencies and how to correct them.
- Improve Soldiers' understanding of new tactics, techniques, and procedures (TTP) by conducting more effective AARs.
- Better focus AAR preparation efforts for VBS2 exercises, saving time and effort in the process.
- Increase Soldiers' buy-in for simulation-based training exercises, causing them to take such exercises more seriously.

This document explains how the *VBS2 AAR Guide* was developed and describes the final version of the guide. It also explains how to utilize the guide to improve the effectiveness of VBS2 mission AARs. The complete guide is provided as Appendix A in hardcopy form. A

companion report (Topolski, Green, Leibrecht, & Rossi, In Preparation) describes the research conducted to develop and evaluate the guide.

Method

The research that produced the *VBS2 AAR Guide* involved close collaboration between research personnel and cadre members of selected institutional courses, especially the Army Reconnaissance Course (ARC) at Fort Knox, Kentucky. The steps included a front-end analysis to identify best practices, development of the guide including a variety of materials, and an evaluation of the guide by selected representatives of the target audience.

The goal of the front-end analysis was to create a solid foundation for the VBS2-focused guide. The analysis began with a literature review that targeted the Army's AAR doctrine, contemporary practices from academia and industry, and VBS2 training documentation. Sources ranged from military publications to professional journals to technical manuals. The review yielded AAR capabilities of the VBS2 system, Army guidelines for conducting AARs, best practices for simulation-supported feedback sessions, and techniques for leveraging simulation-enabled tools. The findings were sorted and prioritized according to their potential utility for application in the VBS2 environment.

The front-end analysis also involved interviewing representatives of the target audience to determine user needs and preferences for an AAR facilitator's guide. The representatives included course managers, instructors and subject matter experts (SME) from the Maneuver Center of Excellence at Fort Knox and the Maneuver Support Center of Excellence at Fort Leonard Wood. In conjunction with the interviews, research SMEs also observed course-related VBS2 exercises including the AARs. This stage of the front-end analysis yielded practical criteria and lessons learned for designing the *VBS2 AAR Guide*.

The development of the guide began with constructing a set of guidelines for integrating VBS2 AAR capabilities into an end-of-mission AAR. The resulting guidelines were organized according to the planning, preparation, and conduct stages of an AAR (Department of the Army, 1993). The guidelines included a structural overview of the VBS2 system, including capabilities and limitations, as well as a list of AAR features available to a system administrator. The guidelines were reviewed within the research team and revised.

In the next development step, the guidelines were expanded and shaped into a facilitator-friendly package aimed at exploiting the AAR features of the VBS2 software. As orientation and enabling materials emerged, they were merged with the guidelines and integrated into a package designed for easy use by trainers. The peer-to-peer learning guide developed earlier for ARC instructors (Cooper, Leibrecht, & Lickteig, In Preparation) served as an initial model. Through two cycles of internal review and revision the *VBS2 AAR Guide* was readied for target audience evaluation.

The guide underwent extensive evaluation and revision to incorporate feedback from the representatives of the target audience. A sample of instructors in three separate U.S. Army courses field tested the guide. The instructors were active duty and contractor personnel at the

Maneuver Center of Excellence (Fort Knox) and the Maneuver Support Center of Excellence (Fort Leonard Wood). They were asked to evaluate the acceptability and usability of the guide, and to provide feedback on which sections could be clarified, expanded, reduced, or deleted. The testing procedure occurred in multiple cycles, with each group of instructors having several opportunities to provide feedback on the guide. Thus, institutional instructors tested the guide and shaped its refinement during the evaluation efforts.

Description of VBS2 AAR Guide

This section presents an overview of the *VBS2 AAR Guide*. The overview addresses the guide's contents, organization, and presentation style. The complete guide is included in hardcopy form as part of this publication (Appendix A).

Tailored to the VBS2 exercise environment, the facilitator's guide offers an easy-to-use resource for self-study and application. The primary features include minimum essential contents; blended mix of orientation, guidelines, job aids, and reference materials; easy-to-follow presentation of contents; concise "chunking" of information; Soldier-friendly packaging; stand-alone capability; and, ready portability.

The minimum essential contents of the guide include orienting information (e.g., why use the VBS2 AAR tools, and what workstation skills are needed); functional guidelines (how-to steps and techniques organized by AAR stage); an application job aid listing VBS2 AAR tools and when to use them; and, reference materials (e.g., basic capabilities of VBS2, sources of additional information). The final topics (see Table 1) are those judged to contribute directly to the performance of AAR facilitation duties. Overall, the limited scope of the contents helps ensure a just-enough level of detail that makes for rapid assimilation of the information.

Table 1

Topics Addressed in the VBS2 AAR Guide

Category	Topics
Orientation Information	What is VBS2? – Overview of the game-based training system.
	What are VBS2's AAR tools? – Summary of feedback-focused features.
	Why use the VBS2 AAR tools? – Advantages and benefits of using the tools.
	What workstation skills are needed? – Enabling competencies and abilities.
Functional Guidelines	How to set up the VBS2 site? – Critical steps and actions.
	Planning the AAR – Look-ahead use of visualization and map capabilities.
	Preparing for the AAR – Steps to get ready in advance of the AAR.
	Conducting the AAR – Setting the stage, maintaining focus, saving materials.
Supplemental Materials	Basic capabilities and limitations of VBS2 – Simulation system overview.
	AAR capabilities of VBS2 – Job aid regarding workstation tools and when to use them.
	Sources of additional information – List of references for self-study.

The *VBS2 AAR Guide* assumes that motivated trainers will study and apply the materials on their own. Because the workstation training program for VBS2 administrators stresses the mechanics of the AAR functions (Bohemia Interactive Australia, 2010), the guide concentrates on why and when to apply the various functions. Strong emphasis is placed on actively engaging Soldiers in the AAR learning process by harnessing technology-enhanced features such as battlefield visualization tools and objective review (replay) of mission execution. Stressing the facilitation of learning, the guidelines help facilitators optimize their performance as coaches and mentors. In practical terms, the guide helps Soldiers to learn quickly and readily from guided discussion. The learning process is accelerated by the ground truth provided by the VBS2 AAR tools.

The eight orientation and functional guideline topics listed in Table 1 provide the main organizing structure of the guide (see “What’s Inside ...”). Each of the eight topics frame a section that contains just enough information for VBS2 AAR purposes. The sections follow a logical sequence that begins with general information and builds progressively through how-to guidelines. The sequence assumes the user will proceed in order through the sections to gain a systematic, comprehensive understanding of the VBS2-supported feedback process. Following the main sections are the three supplemental sections, arranged according to their expected utility in the normal flow of an AAR facilitator’s duties. Pointers embedded at strategic locations in the main sections link the user to the supplemental materials. In short, the organization of the guide is designed to facilitate self-study and job performance by VBS2 AAR facilitators.

The presentation style of the guide is geared for Soldiers working in tactical units and schoolhouses. The language of warfighters is emphasized throughout. In lieu of prose, highly distilled “chunks” of information (e.g., short bullets, concise action statements) are the norm. Distinctive elements (e.g., bold or italicized font) serve to direct the facilitator’s attention and highlight critical information. The job aid listing VBS2 AAR capabilities is presented in a matrix that sets the information in a systematic framework. In essence, the guide’s presentation features – streamlining, visual appeal, familiar language – are designed to engage users in a positive, inviting milieu that encourages routine utilization of the materials provided.

Utilizing the Guide

After the decision to adopt the *VBS2 AAR Guide* for routine use, unit and institutional training managers should establish a process for disseminating it at the organizational level. An electronic copy of the guide can be found at the Defense Technical Information Center web site (<http://www.dtic.mil/dtic/search/tr/index.html>) and maintained on a network server for potential users. Alternatively, a training manager can email the file to AAR facilitators when they need it. Individual users can print the complete file in hardcopy form. This makes it easy for facilitators to carry the guide with them. The guide can be incorporated by reference into a unit’s training guidance documents.

With a hardcopy of the guide in hand, an AAR facilitator can study the orientation sections to increase his/her knowledge of the VBS2 AAR tools and the enabling conditions for harnessing them. By reviewing the functional guideline sections, s/he can then develop an in-depth understanding of the steps and techniques for integrating the VBS2 tools into the AAR

process. These activities are best accomplished in self-study fashion as VBS2 exercises enter the near-term training schedule. The goal is to establish a solid workstation-focused knowledge base for the trainer's role as a VBS2 AAR facilitator.

To employ the guide as a job performance tool, a plan-prepare-conduct model aligns well with the Army's AAR doctrine (Department of the Army, 1993). Throughout the three stages, the hardcopy guide should be kept close at hand to serve as a ready resource.

- Planning the AAR. As the AAR facilitator plans for an approaching VBS2 training event, s/he implements the steps outlined in the guide's "Planning the AAR" section. This stage involves (a) working on an actual VBS2 workstation to prepare an AAR plan and (b) deciding which VBS2 AAR tools best suit the specific conditions of the exercise. The guide's list of steps can be used to determine the completeness and sufficiency of the AAR plan.
- Preparing for the AAR. In preparing for the VBS2 event, the AAR facilitator follows the steps outlined in the guide's "Preparing for the AAR" section. Imperative here is the facilitator's effort to refresh his/her proficiency as a VBS2 administrator, or if necessary, to acquire the required skill set. A dry-run (i.e., AAR rehearsal) will contribute a great deal to Soldiers' learning in the group discussion. Some of the more important preparation steps focus on creating a reviewable record during mission execution and readying the VBS2 workstation after the mission ends. The outline of steps in the guide can serve as a handy checklist to ensure full readiness for the AAR.
- Conducting the AAR. As the facilitator guides the *conduct* of the AAR session, s/he implements the steps outlined in the guide's "Conducting the AAR" section. The precise implementation of the steps will depend partly on the training audience's prior experience with VBS2 exercises. This stage is where the VBS2 AAR tools directly benefit the Soldiers' learning experience, enabling the facilitator to accelerate the learning process. The job aid listing the VBS2 AAR tools may be especially valuable as a real-time crib sheet for the facilitator. Leveraging the tools will help keep the group discussion on track and optimize student learning. The steps in this stage also include saving AAR materials for subsequent review.

As part of their continuing self-development activities, trainers can utilize the guide's list of sources of additional information to expand their AAR facilitation competencies. In private or in consultation with training managers they can decide what additional self-study or practice may be appropriate. Studying other AAR references can help trainers become highly effective VBS2 learning facilitators.

In the hands of unit and institutional trainers, the *VBS2 AAR Guide* can play an important role in optimizing the effectiveness of VBS2 training exercises. Feedback from institutional trainers indicates the guide meets a definite need and benefits Soldier learning. The effective employment of VBS2 AAR capabilities helps strengthen Soldiers' "buy-in" for simulation-based training. By routinely using the guide, trainers can help get the most out of VBS2-supported efforts to improve unit readiness.

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Appendix A

Virtual Battlespace-2 (VBS2) After Action Review (AAR) Guide



VIRTUAL BATTLESPACE-2 (VBS2) AFTER ACTION REVIEW (AAR) GUIDE

◆◆ *A Training Support Tool* ◆◆



About This Guide

This tool gives AAR facilitators a set of guidelines for conducting AARs of VBS2 missions. By exploiting VBS2's special AAR capabilities, the Guide is designed to enhance learning for the training audience.

Developed by:

U.S. Army Research Institute for the Behavioral and Social Sciences
Fort Hood, Texas

November 2010

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What is VBS2?

- ◆ VBS2 is a first-person shooter, semi-immersive, virtual training simulation.
- ◆ The multi-player simulation runs on a network of PC-based workstations.
- ◆ VBS2's virtual environment enables players to operate and interact realistically.
- ◆ A VBS2-proficient trainer controls exercises, serving as the system administrator.
- ◆ VBS2 provides special AAR tools that can enhance the feedback process.
- ◆ See "Basic Capabilities and Limitations of VBS2" below for more information on VBS2.

What are VBS2's AAR tools?

- ◆ Visualization tools such as terrain maps, versatile area of operations (AO) views, and hit lines.
- ◆ Playback features that recreate visual and audio dimensions of the mission.
- ◆ Teaching point tools such as mission briefing, bookmarking, and notes.
- ◆ Timestamp features that help verify timing and chronological sequence.
- ◆ Take-home tools such as saving mission segments and editing/exporting files.

- ◆ See “AAR Capabilities of the VBS2 Workstation” below for information on when to use each tool.

Why use the VBS2 AAR tools?

- ◆ Eliminate uncertainty about who did what.
- ◆ Make the AARs more interesting.
- ◆ Optimize Soldier participation.
- ◆ Sharpen battlefield visualization skills.
- ◆ Strengthen the learning process.
- ◆ Enhance the effectiveness of the AARs.
- ◆ Improve the learning outcomes.

What VBS2 workstation skills are needed?

- ◆ Ability to boot up and initialize the workstations in the proper sequence.
- ◆ Basic proficiency as a VBS2 operator, based on training and practice.
- ◆ Training and practice in employing the AAR capabilities of the workstation.
- ◆ Ability to troubleshoot and fix problems with the workstation and large display.
- ◆ See the summary of VBS2 capabilities in “Basic Capabilities and Limitations of VBS2” below.

How to set up the VBS2 site?

- ◆ Boot up and initialize the workstations in the proper sequence.
- ◆ Connect the controller’s workstation to the large screen display and test it.
- ◆ Select the desired tactical communication settings to match the desired network.
- ◆ Conduct an operational check to make sure the VBS2 functions are working.
- ◆ Verify that voice-over-internet-protocol (VOIP) and interconnectivity are working.

Guidelines for integrating VBS2 into the AAR

Planning the AAR

- ◆ Use visualization capabilities to help formulate the AAR strategy.
 - Use the Training Mission menu option to review the training objectives.

- Use free camera mode to survey the AO, key events, likely mistakes, etc.
- Conduct virtual recon to identify key phases of the mission.
- Study the AO with various views to anticipate friendly and enemy actions.
- ◆ Use map capabilities to select suitable AAR terrain.
 - Use 2-D map views to become familiar with AO terrain.
 - Survey 3-D map to identify candidate AAR sites.
 - Use default camera to decide which terrain will best support AAR discussion.
- ◆ Review VBS2 workstation tools to choose an optimal mix for the AAR.
 - Using the section below titled “AAR Capabilities of the VBS2 Workstation,” decide which VBS2 AAR tools best support the training.
 - Build specific tools (alone or in combination) into the AAR plan, by stage.
- ◆ Schedule adequate time to work on a VBS2 workstation during AAR planning.

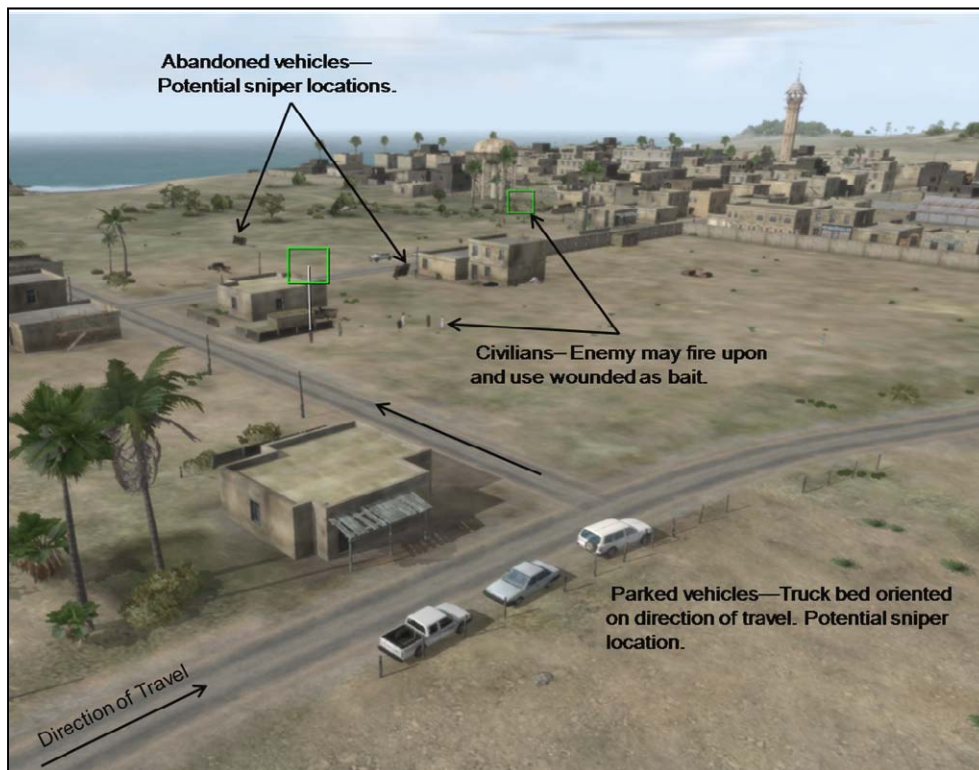
Preparing for the AAR

- ◆ Update own proficiency as a VBS2 administrator beforehand.
 - Review the list of VBS2 workstation skills needed (above, see page 2).
 - Assess own proficiency with VBS2 AAR tools called for in the AAR plan.
 - Practice on a workstation to reach proficiency on stumbling-block skills.
- ◆ Dry-run the AAR before the exercise.
 - Step through the AAR plan, using the VBS2 workstation as needed.
 - Using the free camera mode, note likely points for bookmarking.
 - Position the default camera to cover critical tasks and/or likely mistakes.
 - Identify mission segments or other items to be saved for use after the AAR.
 - Finalize the AAR plan based on the dry-run.
- ◆ Manage AAR recording during mission execution.
 - Start the AAR recording function at the beginning of mission execution.
 - Pause AAR recording during administrative breaks, discussions, etc.
 - Use the bookmark feature to designate key events for AAR playback.
 - Use bookmark notes to save key observations for AAR discussion.
 - Maintain a list of bookmarks to use as a reminder during the AAR.
- ◆ Ready the controller’s workstation and AAR materials after the mission ends.
 - Review bookmarks to help organize AAR discussion around teaching points.
 - Select bookmarked events to support AAR discussion.
 - Enter additional bookmark notes to guide discussion of teaching points.
 - Verify the controller’s workstation is connected to the large screen display.
- ◆ Schedule adequate time on a VBS2 workstation during AAR preparation.

Conducting the AAR

- ◆ Set the AAR stage for the participants.
 - Display the Training Mission to focus participants on the training objectives.
 - Explain how the VBS2 system is being used to enhance the AAR.
 - Encourage close attention to VBS2's video and audio information.
 - Use map views or free camera “fly-over” to establish common picture of AO.
- ◆ Maintain the AAR focus on teaching points.
 - Use video/audio playback to highlight or clarify key teaching points.
 - Use playback and timestamps to verify the chronological order of events.
 - Use free camera views (e.g., Figure. 1) to illustrate different perspectives.
 - Use first-person views to bring specific participants into the discussion.
 - Display selected bookmark notes to support teaching points and discussion.
 - Re-display the Training Mission to re-focus on the training objectives.
 - Explain what Soldiers are seeing (e.g., third-person view, hit lines) as needed.
- ◆ Save AAR materials for later use.
 - In accordance with the AAR plan, save VBS2 take-home materials.
 - Save additional VBS2 materials as identified during the mission or the AAR.
 - Insert a list of saved files into the hand-written notes, with cross-references.

Figure 1. Illustrative free camera view provided by VBS2 (edited with text and arrows).



Basic Capabilities and Limitations of VBS2

Capabilities

VBS2 is a PC-based, fully interactive, three dimensional, first person shooter, synthetic environment capable of simulating a wide range of situations at the Company level and below. Users execute missions in a semi-immersive virtual environment that accurately represents the OE. The system interoperates within a Live, Virtual, Constructive (LVC) environment and interfaces with U.S. Army and Joint Command and Control (C2) systems. VBS2 accurately emulates most U.S. Army weapon systems and the effects of those weapons, both mounted and dismounted. Tactical radio communication (live radio traffic) is modeled through the use of headsets with microphones using (VOIP).

Live-Virtual-Constructive Environment

VBS2 can be federated with other High Level Architecture (HLA) compliant simulations to meet specific training outcomes. For example, dismounted infantry in VBS2 can be connected with a high fidelity armored vehicle simulator. One can also simulate a Special Forces team conducting counter-insurgency missions, while the overall campaign is controlled by a higher level constructive simulation such as OneSAF.

Scenario Development

Comprehensive scenarios can be created through the use of a Virtual Training Kit and edited while the scenario is running through the use of a Real Time Editor (RTE). Users may place the scenario in pause mode to conduct in-stride AARs and either restart the mission where it was stopped or reset the mission completely. Scenarios may be customized to the user's specific equipment and mission needs. A built-in tutorial can show players the control features and enable them to practice executing tasks.

AAR Tools

In addition to the RTE, VBS2 includes robust AAR tools allowing complete review of mission execution. Among the tools are playback of mission execution with radio traffic, and free camera views that allow the facilitator to review the actions from several angles during the playback. A bookmark feature is available that enables the administrator to mark a critical stage of the mission and quickly go back to it during the AAR.

The AAR tools may also be utilized to produce videos for communicating TTP. The TTP are executed while VBS2 captures the mission with the video/audio recording functions. The AAR file can then be edited for use as a communication tool and presented to Soldiers.

Terrain Types

VBS2's terrain database can replicate numerous geo-typical and geo-referenced terrain models around the world. Some of these terrain models are listed below.

Afghanistan	Geo-Typical	Geo-Referenced	Fictional
Kandahar Tarin Kowt	Tropical SW USA Eastern Europe Shakarat Village (Iraq)	National Training Center As Samawah (Iraq) Baghdad-Green Zone	Sahrani (multiple terrain types) Porto (island with small town) Rahmadi (small island)

Training and Mission-Specific Applications

VBS2 can be used to train individual and collective tasks in support of full spectrum operations. Combined Arms and Joint Operations missions can also be trained using VBS2. Some examples of specific training and mission-based applications are listed below.

- Mission rehearsal and/or AO familiarization,
- Tactical training,
- Crew/section battle drills,
- C2 training at the Company level and below,
- Combined Arms or Joint Training,
- Individual training,
- Collective training up to Company level,
- Convoy training (including integration of virtual reality technology),
- Improvised explosive device (IED) defeat,
- Analysis of options (decision support),
- Fire support/forward air controller training,
- Complementary virtual environment for live and constructive simulation or crew trainers,
- Navigation,
- Mission simulation (e.g., aviation elements practicing landing zone (LZ) procedures),
- Vehicle checkpoints and area control,
- Procedural training for unmanned aerial vehicle (UAV) operators,
- Cultural awareness training,
- Visualization of weapon effects,

- Weapon (or platform) familiarization or experimentation,
- Training in urban environments (e.g., military operations on urbanized terrain (MOUT) battle drills), and
- Contact drills.

Limitations

- *Limited capability to train above the company level.* Since VBS2 is a first-person simulation, information sent to higher echelons must come from leaders executing the game. First-person simulations are video games characterized by a three-dimensional view from the player's perspective, often holding a weapon in front. Each position must have an active player in the game in order to generate combat information. Any information sent to higher echelons must come from these players. VBS2 will not generate this information on its own. Therefore training at the battalion level is dependent upon having enough units in the game to accurately represent the combat reporting sent to battalion and higher headquarters. VBS2 cannot generate this type of information without input from player units.
- *Limited ability to train hands-on tasks.* For example, the game can effectively train communication within a tank crew but is not as effective at training gunnery crew drills. The desktop nature of the game limits its ability to replicate actual crew stations. Some movements or actions of the crew are artificial and do not accurately represent actual movements.
- *Limited system fidelity to capture all movements and objects during AAR recording.* The AAR does not capture every frame of action for playback. For example, a player can open vehicle doors and trunks in game but the AAR may not fully capture these actions for playback. The doors will either not open at all during playback or will only partially open. Another system fidelity limitation is the inability of the AAR to replicate objects that are replaced in the player's weapons inventory. For example, if a player is equipped with a search mirror, the mirror replaces the sidearm in the player's inventory. This mirror can be used and viewed by all players in game during AAR recording. However, the AAR will not replicate the mirror during playback, showing only the sidearm that is present in the player's inventory. These limitations may be mitigated by using video software such as FRAPS to record a player's perspective directly from their computer screen.
- *Limited ability to train full tactical communication.* VBS2's desktop nature restricts its ability to replicate actual tactical communication between echelons over distance. Use of headphones with microphones can mitigate this limitation,

but players may still be tempted to talk directly to another unit rather than use the VOIP mechanism. Separating sections by means of partitions or different rooms also helps mitigate this limitation.

Mitigating Limitations

Leaders can mitigate system limitations by carefully analyzing the training event to determine appropriate tasks for execution in VBS2 simulation. Leaders should determine the tasks that best leverage VBS2 capabilities and develop scenarios accordingly. For those tasks not well suited for VBS2, other simulations such as the Close Combat Tactical Trainer (CCTT) may be an option to exercise newly developed TTP.

AAR Capabilities of the VBS2 Workstation

The VBS2 software's primary AAR support features are outlined in the table below.

VBS2 Feature	When to Use
AAR Recording	<ul style="list-style-type: none"> • At the beginning of mission execution, start the AAR recording function. • Position default camera for optimal coverage during set-up of the controller's workstation.
Recording Pause	<ul style="list-style-type: none"> • Temporarily suspend AAR recording during breaks in mission execution.
Bookmark	<ul style="list-style-type: none"> • Mark a critical point during mission execution to serve as a later reference or index. • Quickly jump to a critical point during playback in AAR, using a bookmark recorded earlier.
Bookmark Notes	<ul style="list-style-type: none"> • Type in observations and comments during mission execution, to serve as reminder later. • Review notes during AAR preparation, to select and organize events and teaching points. • Display selected notes while conducting the AAR, to support teaching points & discussion.
Training Mission	<ul style="list-style-type: none"> • Display mission briefing at the AAR's start, to focus participants on training objectives. • Display mission briefing later in the AAR, to restore focus on specific training objectives.
Map View (2-D, 3-D)	<ul style="list-style-type: none"> • Study the AO in advance of scheduled training, to support AAR planning and preparation. • Display an AO map at the start of the AAR, to establish a big picture for the participants. • Display an AO map during the AAR, to support teaching points or respond to questions.

Free Camera View	<ul style="list-style-type: none"> • Recon the AO during exercise preparation, to select an optimal default camera position. • Display key views at the start of the AAR, to highlight critical areas or features of the AO. • Compare the friendly perspective with the enemy perspective (as needed) during the AAR. • Display key views during the AAR, to support teaching points or respond to questions.
Playback	<ul style="list-style-type: none"> • Replay bookmarked portions of the mission during AAR, to support key teaching point(s). • Replay unmarked portions of the mission, to address unanticipated points or questions. • Use audio track (radio traffic) during AAR, to support teaching points or answer questions.
Playback Pause	<ul style="list-style-type: none"> • Temporarily suspend playback during the AAR, while a key teaching point is discussed.
First-Person View	<ul style="list-style-type: none"> • Show what a friendly Soldier was seeing, to support teaching points or answer questions. • Show what an enemy Soldier was seeing, to support teaching points or answer questions. • Compare the views of two or more Soldiers, to illustrate different perspectives.
Third-Person View	<ul style="list-style-type: none"> • Show what an observer could see over a Soldier's shoulder, to support a teaching point. • Compare an observer's view for two or more Soldiers, to illustrate different perspectives.
Entity-Attached View	<ul style="list-style-type: none"> • Show the operation from the perspective of a vehicle or dismount (friendly or enemy). • Highlight key actions from the perspective of a vehicle or dismount (friendly or enemy). • Lock onto a friendly vehicle or dismount to show its actions during a critical event. • Compare the views of two or more vehicles/dismounts, to illustrate different perspectives.
Cursor/Pointer	<ul style="list-style-type: none"> • Use the workstation cursor to point to a key feature of a static (e.g., map) display. • Use the cursor to highlight key feature(s) of dynamic (playback) scenes or imagery. • Use the cursor to indicate objectives, boundaries, routes, obstacles, etc., on a static display.
Timestamp (Bookmark)	<ul style="list-style-type: none"> • Use the timestamps of selected bookmarks to confirm the chronological order of events. • Use a bookmark's timestamp to verify timing in support of a teaching point or question.

Hit Lines	<ul style="list-style-type: none"> • Display hit lines to identify shooters and their targets during mission playback. • Use clock-time information to determine the chronological order of firing events. • Display hit lines during playback to see who was responsible for fratricide(s) and when.
Save/Edit File	<ul style="list-style-type: none"> • Save portions of the mission at the end of the AAR, to be reviewed with written notes later. • Subsequently produce a video for teaching TTP, by editing a recorded file and saving it. • Convert VBS2 files to video format for exporting, so they can be played on other systems.

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* Note: The ADA accession number can be used to locate and download the publication from the Defense Technical Information Center website - www.dtic.mil/dtic/search/tr/index.html.

Acronyms

AAR	After Action Review
AO	Area of Operations
ARI	U.S. Army Research Institute for the Behavioral and Social Sciences
C2	Command and Control
CCTT	Close Combat Tactical Trainer
FRAPS	Video Capture Software
HLA	High Level Architecture
IED	Improvised Explosive Device
LVC	Live, Virtual, Constructive
LZ	Landing Zone
MOUT	Military Operations on Urbanized Terrain

RTE	Real Time Editor
TTP	Tactics, Techniques, and Procedures
UAV	Unmanned Aerial Vehicle
VBS2	Virtual Battlespace-2
VOIP	Voice-Over-Internet-Protocol